

UP
B.

8 (comp.)	Z _S -50	0.5	MAO	1.2	1060	100	10	1.7	97.7	2.6
9 (comp.)	Z _S -50	0.5	TIOA-H ₂ O	1.16	1030	100	30	0.05	1.0	-
10	Z _S -0	0.5	MAO	0.21	200	500	60	15.3	159.2	2.1
11	Z _S -1	0.4	MAO	0.16	195	500	60	21.1	282.6	2.3
12	Z _S -3	0.3	MAO	0.11	195	500	60	30.1	583.3	5.1

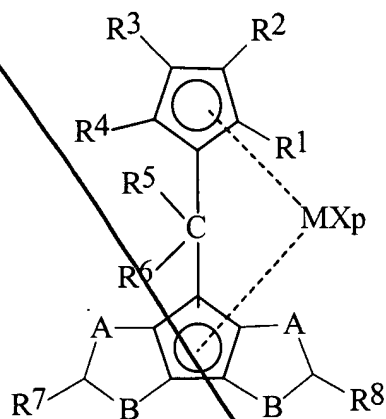
In the Claims:

Please cancel claims 8 and 22 without prejudice or disclaimer.

Please amend claims 1, 2, 4, 6, 9-10, 16-21, and 23-27 as follows:

Sub D1
1. (Twice Amended) A process for the preparation of polymers of ethylene comprising the polymerization reaction of ethylene and optionally one or more olefins in the presence of a catalyst comprising the product obtained by contacting:

(A) a metallocene compound of formula (I):



(I)

wherein

the rings containing A and B have a double bond in the allowed position having an aromatic character;

Sub 129
A and B are selected from sulfur (S), oxygen (O) or CR⁹, R⁹ being hydrogen, a

C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₂-C₂₀-alkenyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl, or

C₇-C₂₀-arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements, with the proviso that if A is S or O, B is CR⁹ or if B is S or O, A is CR⁹, and A and B cannot simultaneously be CR⁹;

R¹, R², R³, R⁴, R⁵, R⁶, R⁷, and R⁸ which may be the same as or different from each other, are hydrogen, a C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₂-C₂₀-alkenyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl, or C₇-C₂₀-arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements, and at least two adjacent substituents R¹ and R², R³ and R⁴, or R⁵ and R⁶ can form a ring comprising 4 to 8 atoms, and where at least one of R¹, R², R³, R⁴, R⁷ and R⁸ is not hydrogen;

M is an atom of a transition metal selected from group 3, 4, 5, 6 or the lanthanide or actinide groups in the Periodic Table of the Elements,

X, which may be the same as or different from each other, is hydrogen, halogen atom, a R¹⁰, OR¹⁰, OSO₂CF₃, OCOR¹⁰, SR¹⁰, NR¹⁰₂ or PR¹⁰₂ group, wherein the substituents R¹⁰ are hydrogen, a C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₂-C₂₀-alkenyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl, or C₇-C₂₀-arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements;

p is an integer of from 1 to 3, being equal to the oxidation state of the metal M minus 2; and

(B) at least one of an alumoxane and a compound of formula D⁺E⁻, wherein D⁺ is a Brønsted acid, able to give a proton and to react irreversibly with a substituent X of the metallocene of formula (I) and E⁻ is a compatible anion, which is able to stabilize the active

Sub DP
cont 1
B2

catalytic species originating from the reaction of the two compounds, and which is sufficiently labile to be able to be removed by an olefinic monomer.

2. (Twice Amended) The process according to claim 1, wherein in the metallocene compound of formula (I) the transition metal M is selected from the group consisting of titanium, zirconium and hafnium.

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cont 2
B3

4. (Twice Amended) The process according to claim 1, wherein in the metallocene compound of formula (I) A and B are sulfur or a CH group, and if A is a CH group, B is sulfur, or if B is a CH group, A is sulfur, R^5 and R^6 are C_1 - C_{20} -alkyl groups, and R^7 is equal to R^8 .

Sub DP
cont 3
B4

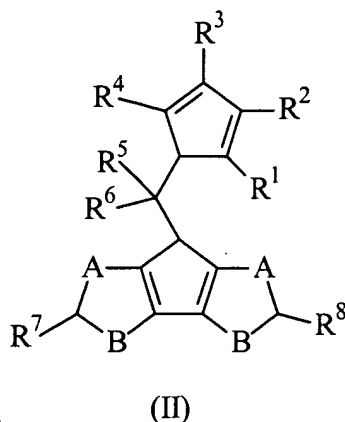
(Twice Amended) The process according to claim 1, wherein said alumoxane is obtained by contacting water with an organo-aluminium compound of formula $H_jAlR^{12}_{3-j}$ or $H_jAlR^{12}_{6-j}$, where R^{12} substituents, same or different, are hydrogen atoms, C_1 - C_{20} -alkyl, C_3 - C_{20} -cycloalkyl, C_6 - C_{20} -aryl, C_7 - C_{20} -alkylaryl or C_7 - C_{20} -arylalkyl, optionally containing silicon or germanium atoms, and j ranges from 0 to 1, being also a non-integer number.

Sub DP
cont 4
B5

(Amended) The process according to claim 1, wherein the anion E^- comprises one or more boron atoms.

10. (Twice Amended) The process according to claim 1, wherein the process is carried out in the presence of an alpha-olefin selected from the group consisting of propylene, 1-butene, 1-pentene, 1-hexene, 4-methyl-1-pentene, 1-octene, 1-decene and 1-dodecene.

16. (Twice Amended) A process for the preparation of a ligand of formula (II):
- B6



or its double bond isomers,

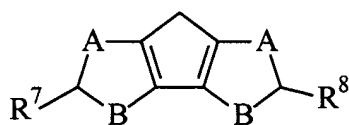
wherein

A and B are selected from sulfur (S), oxygen (O) or CR⁹, R⁹ being hydrogen, a C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₂-C₂₀-alkenyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl, or C₇-C₂₀-arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements, with the proviso that if A is S or O, B is CR⁹ or if B is S or O, A is CR⁹, and A and B cannot simultaneously be CR⁹;

R¹, R², R³, R⁴, R⁵, R⁶, R⁷, and R⁸ which may be the same as or different from each other, are hydrogen, a C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₂-C₂₀-alkenyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl, or C₇-C₂₀-arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements, and at least two adjacent substituents R¹ and R², R³ and R⁴, or R⁵ and R⁶ can form a ring comprising 4 to 8 atoms wherein at least one of the substituents R¹, R², R³, R⁴, R⁷, and R⁸ is not hydrogen;

comprising the following steps:

- i) treating the compound of formula (III) with at least one equivalent of a base;



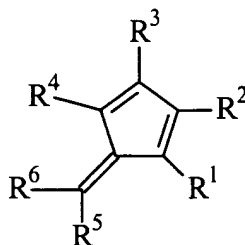
(III)

wherein the rings containing A and B have a double bond in the allowed position having an aromatic character;

wherein A and B are selected from sulfur (S), oxygen (O) or CR⁹, R⁹ being hydrogen, a C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₂-C₂₀-alkenyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl, or C₇-C₂₀-arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements, with the proviso that if A is S or O, B is CR⁹ or if B is S or O, A is CR⁹, and A and B cannot simultaneously be CR⁹;

R⁷, and R⁸ which may be the same as or different from each other, are hydrogen, a C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₂-C₂₀-alkenyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl, or C₇-C₂₀-arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements;

- ii) contacting the thus obtained corresponding anionic compound from step i) with a compound of formula (IV):



(IV)

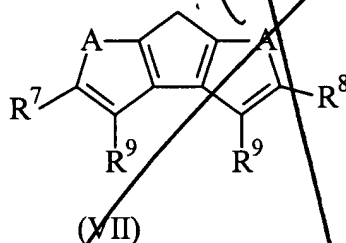
wherein

$R^1, R^2, R^3, R^4, R^5, R^6$ which may be the same as or different from each other, are hydrogen, a C_1 - C_{20} -alkyl, C_3 - C_{20} -cycloalkyl, C_2 - C_{20} -alkenyl, C_6 - C_{20} -aryl, C_7 - C_{20} -alkylaryl, or C_7 - C_{20} -arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements, and at least two adjacent substituents R^1 and R^2 , R^3 and R^4 , or R^5 and R^6 can form a ring comprising 4 to 8 atoms; and

iii) treating the thus obtained product from step ii) with a protonating agent.

17. (Twice Amended) The process for the preparation of a ligand of formula (II) according to claim 16 wherein the base used in step i) is selected from hydroxides, hydrides of alkali- and earth-alkali metals, metallic sodium, potassium or organometallic lithium salts, and the protonating agent used in step iii) is ammonium chloride.

18. (Twice Amended) A process for preparing the compound of formula VII



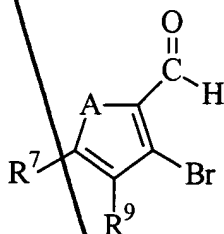
wherein A is sulfur (S) or oxygen (O), R^9 is hydrogen, a C_1 - C_{20} -alkyl, C_3 - C_{20} -cycloalkyl, C_2 - C_{20} -alkenyl, C_6 - C_{20} -aryl, C_7 - C_{20} -alkylaryl, or C_7 - C_{20} -arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements;

R^7 and R^8 which may be the same as or different from each other, are a C_1 - C_{20} -alkyl, C_3 - C_{20} -cycloalkyl, C_2 - C_{20} -alkenyl, C_6 - C_{20} -aryl, C_7 - C_{20} -alkylaryl, or C_7 - C_{20} -arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the

Elements;

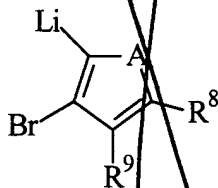
comprising the following steps:

- i) treating a compound of formula (V):



(V)

wherein A is sulfur or oxygen, with a compound of formula (VI):

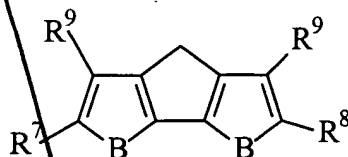


(VI)

wherein A is sulfur or oxygen;

- ii) contacting the thus obtained product from step i) with a reducing agent in a molar ratio between said reducing agent and the product obtained under i) of at least 1;
- iii) contacting the product obtained under ii) with a compound selected from an organolithium compound, sodium or potassium in a molar ratio between said compound and the product obtained in step ii) of equal to or greater than 2; and
- iv) treating the thus obtained product under step iii) with an agent selected from the group consisting of copper (II) chloride, iodine and Mg/Pd, in order to obtain a compound of general formula (VII).

19. (Twice Amended) A process for preparing the compound of formula (X)



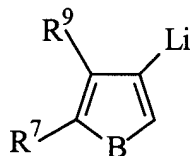
(X)

wherein B is sulfur or oxygen and R⁹ is hydrogen, a C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₂-C₂₀-alkenyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl, or C₇-C₂₀-arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements;

R⁷ and R⁸ which may be the same as or different from each other, are a C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₂-C₂₀-alkenyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl, or C₇-C₂₀-arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements;

comprising the following steps:

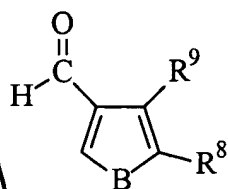
- i) contacting a compound of formula (VIII):



(VIII)

wherein B is sulfur or oxygen,

with a compound of formula (IX):



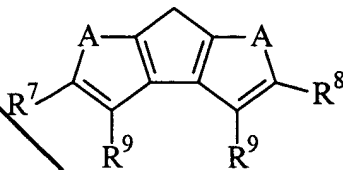
(IX)

wherein B is sulfur or oxygen,

and subsequently treating with a neutralization agent;

- ii) treating the thus obtained product from step i) with a reducing agent in a molar ratio between said reducing agent and the compound obtained under i) of at least 1;
- iii) contacting the thus obtained product from step ii) with a mixture of an organolithium compound and tetramethylethylenediamine (TMEDA) in a molar ratio between said mixture and the product obtained under ii) of at least 2; and
- iv) contacting the thus obtained product from step iii) with an agent selected from the group consisting of copper (II) chloride, iodine and Mg/Pd, in order to obtain a compound of formula (X).

20. (Twice Amended) A process for preparing the compound of formula (VII)



(VII)

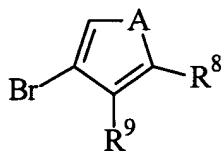
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cont 12

wherein A is sulfur (S) or oxygen (O), R^9 is hydrogen, a C_1 - C_{20} -alkyl, C_3 - C_{20} -cycloalkyl, C_2 - C_{20} -alkenyl, C_6 - C_{20} -aryl, C_7 - C_{20} -alkylaryl, or C_7 - C_{20} -arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements;

R^7 and R^8 which may be the same as or different from each other, are a C_1 - C_{20} -alkyl, C_3 - C_{20} -cycloalkyl, C_2 - C_{20} -alkenyl, C_6 - C_{20} -aryl, C_7 - C_{20} -alkylaryl, or C_7 - C_{20} -arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements;

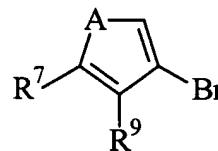
comprising the following steps:

- i) contacting an equimolar mixture of compounds of formulae (XI) and (XII):



(XI)

and



(XII)

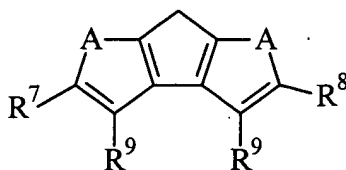
wherein A is sulfur or oxygen,

with a Lewis acid or a mixture of a Lewis acid and a protonic acid;

- ii) treating the thus obtained product from step i) with CH_2O in a molar ratio between said mixture and CH_2O of a range between 10:1 and 1:10;
- iii) contacting the thus obtained product from step ii) with a compound selected from an organolithium compound, sodium or potassium; and
- iv) contacting the thus obtained product from step iii) with an agent selected from the group consisting of copper (II) chloride, iodine and Mg/Pd , in order to obtain a compound of general formula (VII).

Sub DP
cont 12
21. (Twice Amended) The process according to claim 20, wherein the Lewis acid is selected from the group consisting of zinc dichloride, cadmium dichloride, mercury dichloride, tin tetrachloride, trifluoroborane, zirconium tetrachloride, and titanium tetrachloride.

Sub DP
cont 13
23 (Twice Amended) A process for preparing the compound of formula (VII)



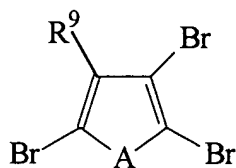
(VII)

wherein A is sulfur (S) or oxygen (O), R⁹ is hydrogen, a C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₂-C₂₀-alkenyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl, or C₇-C₂₀-arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements;

B
R⁷ and R⁸ which may be the same as or different from each other, are a C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₂-C₂₀-alkenyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl, or C₇-C₂₀-arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements;

comprising the following steps:

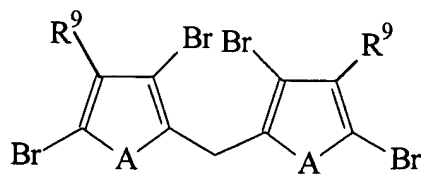
i) contacting a compound of formula (XIII):



(XIII)

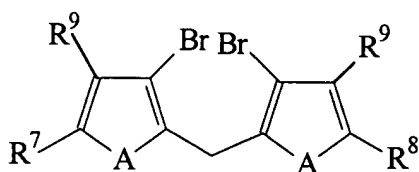
with a base selected from an organolithium compound, sodium or potassium;
treating with a formic ester, wherein the molar ratio between said ester and the

compound of formula (XIII) is at least 1:2, and subsequently treating the obtained product with a reducing agent in order to obtain a compound of formula (XIV):



(XIV)

- ii) contacting the compound of formula (XIV) with a base selected from an organolithium compound, sodium or potassium and subsequently treating the dimetallated compound with an alkylating agent to obtain the compound of formula (XV);

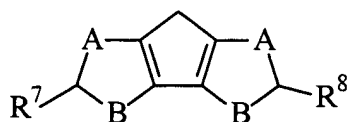


(XV)

and

- iii) contacting the alkylated compound obtained by step ii) with a coupling agent selected from the group consisting of copper (II) chloride, iodine and Mg/Pd in order to obtain the compound of formula (VII).

24. (Twice Amended) A compound of formula (III)



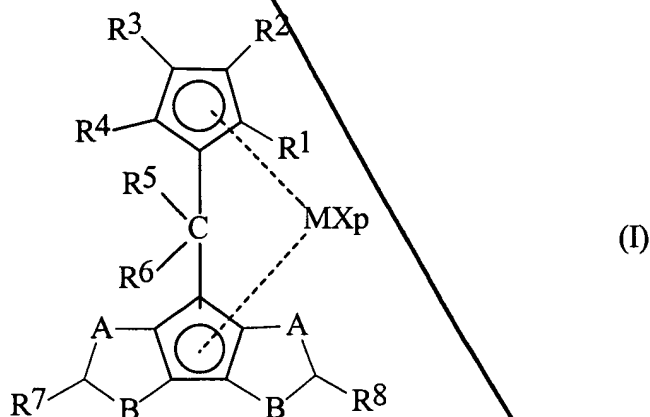
(III)

wherein the rings containing A and B have a double bond in the allowed position having an

aromatic character; A and B are

selected from sulfur (S), oxygen (O) or CR⁹, R⁹ being hydrogen, a C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₂-C₂₀-alkenyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl, or C₇-C₂₀-arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements, with the proviso that if A is S or O, B is CR⁹ or if B is S or O, A is CR⁹, and A and B cannot simultaneously be CR⁹; and R⁷, and R⁸ which may be the same as or different from each other, are a C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₂-C₂₀-alkenyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl, or C₇-C₂₀-arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements.

25 (Twice Amended) A metallocene compound of formula (I):



wherein

A and B are selected from sulfur (S), oxygen (O) or CR⁹, R⁹ being hydrogen, a C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₂-C₂₀-alkenyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl, or C₇-C₂₀-arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements, with the proviso that if A is S or O, B is CR⁹ or if B is S or O, A is CR⁹, and A and B cannot simultaneously be CR⁹;

Subpart 107

$R^1, R^2, R^3, R^4, R^5, R^6, R^7$, and R^8 which may be the same as or different from each other, are hydrogen, a C_1 - C_{20} -alkyl, C_3 - C_{20} -cycloalkyl, C_2 - C_{20} -alkenyl, C_6 - C_{20} -aryl, C_7 - C_{20} -alkylaryl, or C_7 - C_{20} -arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements, and at least two adjacent substituents R^1 and R^2 , R^3 and R^4 , or R^5 and R^6 can form a ring comprising 4 to 8 atoms; and where at least one of R^1, R^2, R^3, R^4, R^7 and R^8 is not hydrogen;

M is an atom of a transition metal from group 3, 4, 5, 6 or the lanthanide or actinide groups in the Periodic Table of the Elements,

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X, which may be the same as or different from each other, is hydrogen, halogen atom, a R^{10} , OR^{10} , OSO_2CF_3 , $OCOR^{10}$, SR^{10} , NR^{10}_2 or PR^{10}_2 group, wherein the substituents R^{10} are hydrogen, a C_1 - C_{20} -alkyl, C_3 - C_{20} -cycloalkyl, C_2 - C_{20} -alkenyl, C_6 - C_{20} -aryl, C_7 - C_{20} -alkylaryl, or C_7 - C_{20} -arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements;

p is an integer of from 1 to 3, being equal to the oxidation state of the metal M minus 2;

and wherein the rings containing A and B have a double bond in the allowed position having an aromatic character; and

with the proviso that said metallocene compound is different from:

isopropylidene(3-methyl-cyclopentadienyl)-7-(cyclopentadithiophene)zirconium dichloride;

isopropylidene(3-ethyl-cyclopentadienyl)-7-(cyclopentadithiophene)zirconium dichloride;

isopropylidene(3-t-butyl-cyclopentadienyl)-7-(cyclopentadithiophene)zirconium dichloride;

Sub 122
isopropylidene(3-n-butyl-cyclopentadienyl)-7-(cyclopentadithiophene)zirconium

dichloride;

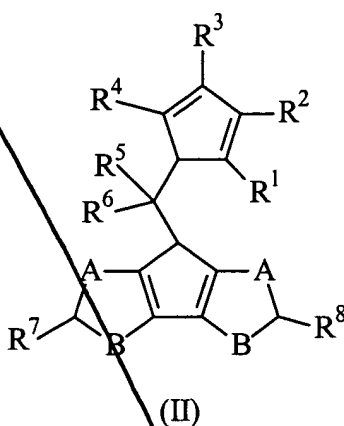
isopropylidene(3-trimethylsilyl-cyclopentadienyl)-7-(cyclopentadithiophene)zirconium

dichloride and

isopropylidene(3-i-propylcyclopentadienyl)-7-(cyclopentadithiophene)zirconium

dichloride.

26 (Twice Amended) A ligand of formula (II):



or its double bond isomers,

wherein the rings containing A and B have double bonds in any of the allowed positions,

having an aromatic character and

A and B are selected from sulfur (S), oxygen (O) or CR⁹, R⁹ being hydrogen, a C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₂-C₂₀-alkenyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl, or C₇-C₂₀-arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements, with the proviso that if A is S or O, B is CR⁹ or if B is S or O, A is CR⁹, and A and B cannot simultaneously be CR⁹;
R¹, R², R³, R⁴, R⁵, R⁶, R⁷, and R⁸ which may be the same as or different from each other, are hydrogen, a C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₂-C₂₀-alkenyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl,

Sub 129
cont 129
or C₇-C₂₀-arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements, and at least two adjacent substituents R¹ and R², R³ and R⁴, or R⁵ and R⁶ can form a ring comprising 4 to 8 atoms and wherein at least one of the substituents R¹, R², R³, R⁴, R⁷, and R⁸ is not hydrogen;

with the proviso that said ligands are different from:

isopropylidene(3-methyl-cyclopentadiene)-7-(cyclopentadithiophene);

isopropylidene(3-ethyl-cyclopentadiene)-7-(cyclopentadithiophene);

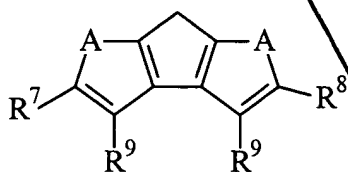
isopropylidene(3-t-butyl-cyclopentadiene)-7-(cyclopentadithiophene);

isopropylidene(3-n-butyl-cyclopentadiene)-7-(cyclopentadithiophene);

isopropylidene(3-trimethylsilyl-cyclopentadiene)-7-(cyclopentadithiophene) and

isopropylidene(3-i-propylcyclopentadiene)-7-(cyclopentadithiophene).

27 (Amended) A process for preparing the compound of formula (VII)



(VII)

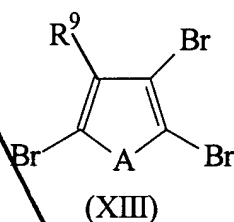
wherein A is sulfur (S) or oxygen (O), R⁹ is hydrogen, a C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₂-C₂₀-alkenyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl, or C₇-C₂₀-arylalkyl radical,

Sub 12
containing optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements;

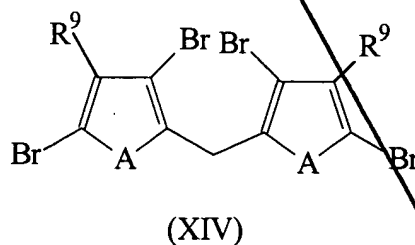
R^7 and R^8 which may be the same as or different from each other, are a C_1 - C_{20} -alkyl, C_3 - C_{20} -cycloalkyl, C_2 - C_{20} -alkenyl, C_6 - C_{20} -aryl, C_7 - C_{20} -alkylaryl, or C_7 - C_{20} -arylalkyl radical, optionally containing heteroatoms belonging to groups 13 or 15-17 of the Periodic Table of the Elements;

comprising the following steps:

- i) contacting a compound of formula (XIII):



with a base selected from an organolithium compound, sodium or potassium; treating with a formic ester, wherein the molar ratio between said ester and the compound of formula (XIII) is at least 1:2, and subsequently treating the obtained product with a reducing agent in order to obtain a compound of formula (XIV):



- ii) contacting the compound of formula (XIV) with a base selected from an organolithium compound, sodium or potassium and subsequently treating the dimetallated compound with an ester of boric acid and a protonating agent in